

Claims

- [c1] 1.A process for producing phosgene, comprising:
introducing a carbon monoxide stream to a metal oxide impregnated activated carbon;
reducing a hydrogen sulfide concentration in the carbon monoxide stream to produce a cleaned stream, wherein a cleaned stream hydrogen sulfide concentration is less than or equal to about 20 ppm; and
reacting carbon monoxide in the cleaned stream with chlorine to produce phosgene.
- [c2] 2.The process of Claim 1, further comprising:
introducing the carbon monoxide stream to activated carbon that has not been impregnated with a metal oxide prior to introducing the carbon monoxide stream to the metal oxide impregnated activated carbon; and
reducing a concentration of at least one of carbonyl sulfide and carbon disulfide in the carbon monoxide stream.
- [c3] 3.The process of Claim 2, further comprising:
regenerating the metal oxide impregnated activated carbon by:
ceasing the introduction of the carbon monoxide stream

to the metal oxide impregnated activated carbon;
introducing an inert gas stream comprising oxygen to
the metal oxide impregnated activated carbon, wherein
at least one of the metal oxide impregnated activated
carbon is heated to a temperature of greater than or
equal to about 350°C or the inert gas stream is at a tem-
perature of greater than or equal to about 350°C; and
removing sulfur dioxide from the metal oxide impreg-
nated activated carbon.

[c4] 4.The process of Claim 3, wherein the oxygen is present
in the inert gas stream in an amount of about 0.2 vol% to
about 2 vol%, based upon a total volume of the inert gas
stream.

[c5] 5.The process of Claim 1, wherein the metal oxide is se-
lected from the group consisting of copper oxide, lan-
thanum oxide, zinc titanate, iron oxides, calcium oxide,
silica, aluminum oxide, and combinations comprising at
least one of the foregoing metal oxides.

[c6] 6.The process of Claim 5, wherein the metal oxide com-
prises copper oxide.

[c7] 7.The process of Claim 1, wherein the hydrogen sulfide
concentration is less than or equal to about 10 ppm.

[c8] 8.The process of Claim 7, wherein the hydrogen sulfide

concentration is less than or equal to about 2 ppm.

- [c9] 9.The process of Claim 8, wherein the carbon monoxide stream introduced to the metal oxide impregnated activated carbon has a hydrogen sulfide concentration of greater than or equal to about 100 ppm.
- [c10] 10.The process of Claim 1, further comprising removing water from the cleaned stream to form a dried stream, prior to reacting the carbon monoxide with the chlorine.
- [c11] 11.The process of Claim 10, further comprising mixing the dried stream with the chlorine prior to introducing the dried stream to a reactor.
- [c12] 12.The process of Claim 1, further comprising introducing the cleaned stream to an activated carbon that has not been impregnated with a metal oxide, prior to reacting the carbon monoxide with the chlorine.
- [c13] 13.The process of Claim 1, further comprising adjusting a moisture content of the carbon monoxide stream prior to introducing it to the metal oxide impregnated activated carbon.
- [c14] 14.A system for producing phosgene, comprising:
a carbon monoxide supply;
a metal oxide impregnated activated carbon; and

a reactor disposed downstream of and in fluid communication with the metal oxide impregnated activated carbon and with a chlorine supply.

[c15] 15.The system of Claim 14, further comprising an initial activated carbon that has not been impregnated with a metal oxide disposed upstream and in fluid communication with the metal oxide impregnated activated carbon.

[c16] 16.The system of Claim 15, further comprising a moisture removal unit disposed downstream of the metal oxide impregnated activated carbon and upstream of the reactor.

[c17] 17.The system of Claim 16, further comprising a mixer disposed downstream of the moisture removal unit and upstream of the reactor.

[c18] 18.A system for producing phosgene, comprising:
a carbon monoxide supply;
a first sulfur removal unit comprising an initial activated carbon that has not been impregnated with a metal oxide;
a second sulfur removal unit comprising a metal oxide impregnated activated carbon downstream and in fluid communication with the first sulfur removal unit;
a moisture removal unit disposed downstream of and in

fluid communication with the second sulfur removal unit;
and
a reactor disposed downstream of and in fluid communication with a chlorine supply unit and the moisture removal unit.